

Creating energy communities – experiences of Orkney, Scotland

Energy World readers were introduced to the tidal energy prospects for the Pentland Firth, which separates mainland Scotland from Orkney, in the June 2008 issue. Here, Gareth Davies discusses energy initiatives and projects carried out by local communities from these northern islands.

It is true to say that energy pervades every facet of our lives. Yet the industrial revolution, urbanisation, national grids and cheap energy have systematically distanced many people from the details of energy supply and demand. Until recently many people were simply unaware of them. In the time of plentiful energy without consequence, few were aware of how much they paid for energy; fewer still considered how profligate they were in using energy or the impacts that arose from our energy systems.

However, with increased energy prices and the reality of global warming beginning to dawn on the world, people have shown an increased interest in what energy they use and what it costs. This new and increased awareness about energy issues has triggered a number of reactions: a minority protest, some save, a few generate and others pontificate. Most people have yet to alter their behaviour and still just sit around and watch.

The unfortunate truth is that if we go on using energy as we are, we, the consumer, remain a big part of the problem with increasing demand and fixed expectations about energy supply. By wholeheartedly embracing new energy systems consumers could become the agents of change and part of the solution, by reducing use and adopting more flexible patterns of energy demand. The renewable energy revolution that can contribute much of this change could transform our energy systems, and has the potential to touch and empower everyone in the world community.

Communities themselves are going to be particularly important in this process. One of the features of communities is that they bind people together with shared values, aspirations and lifestyles. They also provide a critical mass and a diversity of skills and facilities that can be applied to both problems and opportunities.

This article considers how one community, Orkney, has embraced energy in many forms and how its relationship with energy can provide many lessons, good and bad, that others can learn from.

Orkney

Orkney is an archipelago with 17 inhabited islands situated off the north coast of Scotland; it has a stable population of around 20,000.

Due to its position on the great circle route across the north Atlantic, its sheltered harbours and sounds, productive land and abundant fresh water, it has always been a key stopping point for ships and seafarers. The extensive Neolithic, Bronze Age, Pictish and Viking relics are testimony to the islands' ancient importance.

Trade with the North American bound Hudson Bay Company ships, the Atlantic whaling fleets and the coastal fishing fleets have all been centred on Orkney for significant periods during the last 200 years. Orkney was also a strategic military base during the Napoleonic and World Wars. The Orkney economy is based upon tourism, farming, fishing, food and drink, jewellery, crafts and energy.

When it comes to energy, Orkney again has strategic importance. It was the test location for a number of early aerogenerators – the forerunners of the modern wind turbines which now provide 30–40% of the islands electricity. It was also selected as a base for one of the UK's major oil terminals in the early 1970s. Since 2000, Orkney has become the world's leading centre for marine renewables developments and is home to the unique European Marine Energy Centre (EMEC).

One particularly important spin-off from this more recent energy focus is that Orkney has also become a trailblazer when it comes to community energy.

Community energy

The first moves were made in the mid 1990s when a local Orkney company re-commissioned an experimental 3 MW wind turbine that had fallen idle. This project stimulated renewed interest in wind energy and led in part to the formation of the Orkney Renewable Energy Forum (OREF).

OREF aims to promote the sustainable development of renewable energy technologies in Orkney for the benefit of the local community and the environment. With

little government support available at the time for such projects, a group of local people banded together to establish an 860 kW, locally-owned wind turbine which was installed in 2006. At a similar time moves were started on the island of Westray to establish its own community-owned wind turbine. The funding package is now finalised and installation should take place soon. Other communities within Orkney have followed this example and seven further community projects are now being developed.

In addition to these community projects, a number of locally-owned projects are also being pursued – some with inward investment support. As well as these large megawatt-scale projects, there have been numerous smaller micro-renewables projects based upon micro-wind turbines, ground source heat pumps, air source heat pumps, biomass heating plants with micro-district heating, bio-digestion, bio-fuel, solar PV projects and low energy house building projects.

In Orkney, energy-related terms such as 'firm and non-firm connections', 'grid use of system charges', 'carbon footprints' and 'energy poverty' are becoming commonplace and the local papers now carry weekly energy related articles.

So what are the opportunities for communities in relation to energy?

Firstly, it is worthwhile considering what a community provides. It creates a critical mass which in turn increases the investment potential and the diversity of skills available to a project. This critical mass makes energy projects that would be difficult for the individual to achieve more viable.



Community wind turbine powering the heating system at the Westray Church

There are many benefits to the community, including:

- the energy generated from local schemes can be used to reduce longer term energy costs for directly supplied customers;
- in resource rich areas, surplus energy can be sold back to the grid creating a new revenue stream for initiatives within the community;
- energy production, being technology based, also creates a number of skilled and well paid jobs. Orkney, for example, has around 150 workers in the renewables sector and around 500 in the wider energy sector;
- the adoption of renewable energy by a community also provides a practical commitment to reducing the emissions of greenhouse gases and shows others what can be achieved; and
- a further spin-off from embracing energy opportunities is the renewed vigour and coherence that it can provide to wider community spirit.

By moving first and fast a community can quickly establish a global reputation for progressive and green development, as shown by Orkney's example.

How has Orkney achieved its energy ambitions

The Orkney Islands were tuned to the opportunities that energy can provide by oil. The Flotta Oil Terminal in Orkney provided a throughput tariff at the start of operations which created an investment fund that is being used to help offset longer term economic uncertainty once the oil starts to run out. This experience showed Orkney how energy revenues could help sustain and develop an island archipelago economy.

A further factor in Orkney's success has been its willingness to embrace new ideas and change. Basically if a new opportunity, such as renewable energy generation, arises it is evaluated and if considered to have merit is rapidly adopted and assimilated to help sustain economic vitality. This does not mean that everybody agrees with all energy initiatives. However, there is a general willingness to listen to the case for development and to put the wider community interests first if it is felt that the case stacks up. The coherence of this approach to energy within a place like Orkney arises from a strong sense of community identity.

The basic need for affordable energy also drives many energy initiatives in the islands. Orcadians are heavy energy users due to weather conditions, the age of housing and journey distances. The islands are also subject to high energy prices (typically 10% to 20% higher than UK mainland prices). These factors combine to create high levels of energy poverty, currently running at around 20% of households.

There are three possible solutions to this situation that are being applied in Orkney. These are: using less energy, reducing the

price of energy and increasing incomes in vulnerable households.

There are a number of initiatives in Orkney aimed at reducing energy use, including a high street drop-in centre targeting energy efficiency. There is also healthy competition in the housing market for new energy efficient housing designs.

Others have reduced their energy bills by establishing their own supply and many householders and landlords are now installing micro-generation units. Household incomes have been raised through direct support, in the form of a winter heating payment from community benefit funds.

Increasing the overall level of economic activity and creation of higher value jobs are also important, and significant encouragement has been given by public bodies to the development of the energy sector in Orkney.

For jobs you need people, thus the resourcefulness and reliability of the islands' workforce is also a key strength. Education lies at the core of this and as well as an excellent schools engagement programme run by the local energy advice centre, Orkney has two tertiary education establishments. ICIT specialises in MSc and PhD studies in marine renewables, whilst the Orkney College has a strong Agronomy Research Unit looking into bio-fuel crops.

Underpinning all of these factors are the excellent energy resources that envelope the islands. Strong winds seemingly blow continuously across the undulating terrain. Huge waves pound the coastline and swift tidal currents flow between and around the islands. Although the growing season is short, the productivity of crops and livestock is remarkably good. It should also not be forgotten that Orkney lies adjacent to one of the most productive oil basins in the world. Orkney is therefore blessed with a range of world class energy resources.

Lessons for other areas

So what are the lessons from Orkney that could help other areas with energy aspirations achieve their objectives?

The first step is to recognise and understand what resources an area has. This goes beyond simply measuring the wind, waves or tide. It needs to take into account existing and possible infrastructure, local facilities, other competing and synergistic activities, present and future energy markets and most of all the skills, knowledge and capabilities of local people. Once the scale, distribution and character of these resources are understood, truly effective planning for community energy futures can take place.

One of the major hurdles that may need to be overcome is outdated regulatory controls. These were often designed to manage the old centralised forms of generation and are unsuitable for a more dispersed and diverse energy supply mix. Getting such systems changed can prove to be extremely challenging.



Discussion at the Orkney islands Council Sustainable Energy Strategy workshop

Whatever opportunities are available they will need to be explained and discussed within the community at an early stage to ensure people understand what is proposed. In this way, fear of the unknown can be reduced and people can reach their own decisions rather than relying on media or internet myths. The discussion needs to be transparent, take into account what is happening today, raise awareness of the various options that exist for the future and of the consequences that they may have. It is unlikely that any option will be trouble free but, as the Stern Report points out the status quo is not a viable option, change is inevitable.

The solutions that are adopted will be best if they are broad based and consider energy in an integrated way. At the start this may seem complex, but in the end it is essential, because sustainable solutions will have to integrate within an overall energy system.

It will be necessary to encourage and support energy champions, people who have the skill and commitment to see projects through to success.

Last but not least, there needs to be a clear and distinct benefit for the local community. Whether it is revenue, jobs, publicity, energy itself, cheaper energy or security of supply, the benefits of any scheme need to be clearly understood and communicated.

So many times in the past, large-scale energy initiatives have ignored or even harmed communities. This time around communities can be at the heart of the new energy revolution. It needs ambition, drive, determination from the communities themselves and real engagement from the commercial energy sector. Energy communities will be an important power house for our future cleaner and greener world. ●

Gareth Davies is MD of Aquatera, a consultancy company in Orkney specialising in environmental and sustainable development issues associated with the energy sector, and is the current chair of OREF; e: office@aquatera.co.uk